

## 7.6 Solving Financial Problems using TVM

There are variety of technological tools for calculating compound interest:

- spreadsheets
- calculators
- web sites of financial instructions
- **graphing calculators**



### Using TVM

1. APPS
2. Finance
3. Enter
4. TVM Solver
5. Enter



### Financial Screen:

N=  
I%=  
PV=  
PMT=  
FV=  
P/Y=  
C/Y=  
PMT: END BEGIN

### Financial Screen:

N=  
I%=  
PV=  
PMT=  
FV=  
P/Y=  
C/Y=  
PMT: END BEGIN

Need to **UNDERSTAND** and **REMEMBER** the following meanings

N- total number of payment periods ( # of years x # of periods per year)

I%- **annual** interest rate as a percent, not as a decimal

PV- present value

PMT- regular payment amount

FV- future value

P/Y- number of payment periods per year

C/Y- number of compound periods per year

PMT: END BEGIN **be sure END is highlighted**

Will always match while doing compound interest as your interest gets paid at the end of each compounding period

Money that is paid ( money outflow)- should be entered as a **negative** value

Money that is received ( money inflow)- should be entered as a **positive** value

To solve for a variable: Move the cursor to that variable

Press ALPHA ENTER

Ex 1:

Shaun needs to pay for his university loan of \$5000. The interest rate of the loan is 2.5%/a compounded monthly and must be paid as a lump sum at the end of the 2 year term. How much will Shaun have to pay back?

Financial Screen:

⇒ N=  $2 \times 12 = 24$

I%= 2.5

PV= 5000

PMT= 0

FV= ?

P/Y= 12

C/Y= 12 } compound periods

PMT: END BEGIN

N- total number of payment periods (# of years x # of periods per year)

I%- annual interest rate as a percent, not as a decimal

PV- present value

PMT- regular payment amount

FV- future value

P/Y- number of payment periods per year

C/Y- number of compound periods per year

PMT: END BEGIN be sure END is highlighted

Will always match  
for compound interest

Pay Attention:

When no payments are involved in solving compound interest

problems:

PMT=0

∴ he must  
pay back \$5256.08

Ex 2:

How much did Heather invested at 4%/a compounded semi-annually for 3 years if the final amount was \$7500

Financial Screen:

N= 6

I%= 4

PV= ?

PMT= 0

FV= 7500

P/Y= 2

C/Y= 2

PMT: END BEGIN

\$6659.79

$$P = \frac{A}{(1+i)^n}$$

∴ Heather invested  
\$6659.79.

$$= \frac{7500}{\left(1 + \frac{0.04}{2}\right)^6}$$

Ex 3:

What annual interest rate was Mike charged if an \$800 credit card bill grew to \$920.99 in 6 months and the interest was compounded monthly.

Financial Screen:

N= 6  
 I%= 28.5%  
 PV= 800  
 PMT= 0  
 FV= 920.99  
 P/Y= 12  
 C/Y= 12  
 PMT: END BEGIN

$$0.5 \times 12$$

$$28.5\%$$

Check the answer with a formula.

$$A = P(1+i)^n$$

$$\frac{920.99}{800} = \frac{800(1+i)^6}{800}$$

$$\sqrt[6]{\frac{920.99}{800}} = (1+i)^6$$

$$1.0237 = 1+i$$

$$i = 1.0237 - 1$$

$$i = 0.0237$$

Rate

$$= 0.0237 \times 12$$

$$= 0.2844$$

$$= 28.4\%$$

∴ the interest rate is 28.4%

Ex 4:

Approximately how long would it take for a \$15000 investment to double if it earns 10%/a interest compounded semi-annually?

Financial Screen:

N= 14.21  
 I%= 10  
 PV= 15000  
 PMT= 0  
 FV= 30000  
 P/Y= 2  
 C/Y= 2  
 PMT: END BEGIN

Check the answer with a formula.

$$A = P(1+i)^n$$

$$\frac{30000}{15000} = \frac{15000(1 + \frac{0.10}{2})^n}{15000}$$

$$2 = (1.05)^n$$

$$n = \frac{\log 2}{\log 1.05}$$

$$n = 14.21$$

∴ it takes approx. 7 years & 1 month.

# of years

$$= \frac{14.21}{2}$$

$$= 7.1$$

n  
compounded  
Period  
Months

$$= 0.1 \times 12$$

$$= 1.2$$

Round



Solve using a TVM solver  
page 487 # 2 -14.